APPENDIX 0-4.

Interaction Tables for the Immunology Assessment Occupation Removed from Final Model

This appendix contains exposure analyses results of interactions between covariates and dioxin after occupation and diabetic class have been removed from those final dioxin models (Models 2 through 6) that contained occupation. These tables are supplements to tables in Appendix O-3, which are main effects results with occupation removed from the model. Results are presented for separate strata of the covariate and include sample sizes, percent abnormal, relative risks, confidence intervals, and p-values for discrete dependent variables. Sample sizes, adjusted means, differences of adjusted means and confidence intervals or adjusted slopes and standard errors, and p-values are given for continuous dependent variables. Chapter 7, Statistical Methods, provides further details on the analytical approaches used in the interaction analyses. The analysis model, covariate involved in the interaction, and a reference to the analysis table in Chapter 19, Immunology Assessment, are given in the heading of each subtable. A summary of the interactions described in this appendix follows.

Appendix O-4 Tablė	Chapter 19 Table	Appendix O-3 Table	Dependent Variable	Model	Covariate
O-4-1	19-5	0-3-2	CD3 Cells	3	Age
0-4-2	19-6	O-3-3	CD4 Cells	3	Age
O-4-3	19-7	O-3-4	CD5 Cells	3	Age
O-4-4	19-9	O-3-6	CD14 Cells	3	Age
O-4-5	19-10	O-3-7	CD16 + 56 Cells	3	Lifetime Alcohol History
O-4-6	19-12	O-3-9	CD25 Cells	3	Age, Lifetime Cigarette Smoking History, Lifetime Alcohol History
0-4-7	19-14	O-3-11	Double Labelled Cells: CD3 with CD25	3	Lifetime Cigarette Smoking History, Lifetime Alcohol History
O-4-8	19-16	O-3-12	Double Labelled Cells: CD4 with CD8	3	Age
0-4-9	19-19	O-3-14	IgA	3	Race
O-4-10	19-27	O-3-17	Lupus Panel: Rheumatoid Factor	3	Physical Activity Index

Table O-4-1.

Interaction Table for CD3 Cells (cells/mm³)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Age: Tables 19-5 and O-3-2)

Stratum	Dioxin Category	1	Adjusted Mean ^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.) ^b	p-Value ^c
Born ≥ 1942	Comparison	183	1,447.6		
	Background RH	47	1,403.6	-44.0	0.635
	Low RH	21	1,615.9	168.3	0.231
	High RH	65	1,500.0	52.4	0.533
	Low plus High RH	86	1,527.5	79.9	0.301
Born < 1942	Comparison	217	1,440.0		
	Background RH	93	1,553.8	113.8	0.121
	Low RH	74	1,358.8	-81.2	0.281
	High RH	41	1,486.6	46.6	0.639
	Low plus High RH	115	1,403.1	-36.9	0.574

^a Transformed from natural logarithm scale.

Note: RH = Ranch Hand.

Comparison: Current Dioxin ≤ 10 ppt.

Background (Ranch Hand): Current Dioxin ≤ 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.

^b Difference of means after transformation to original scale; confidence interval on difference of means not presented because analysis was performed on natural logarithm scale.

^c P-value is based on difference of means on natural logarithm scale.

Table O-4-2.

Interaction Table for CD4 Cells (cells/mm³)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Age: Tables 19-6 and O-3-3)

Stratum	Dioxin Category	n	Adjusted Mean ²	Difference of Adjusted Mean vs. Comparisons (95% C.I.) ^b	p-Value ^c
Born ≥ 1942	Comparison	183	927.5		
	Background RH	47	912.7	-14.8	0.808
	Low RH	21	1,075.5	148.0	0.114
	High RH	65	966.2	38.7	0.482
	Low plus High RH	86	991.8	64.3	0.206
Born < 1942	Comparison	220	919.5		
	Background RH	94	991.5	72.0	0.129
	Low RH	74	864.1	-55.4	0.255
	High RH	43	957.8	38.3	0.545
	Low plus High RH	117	897.4	-22.1	0.601

^a Transformed from natural logarithm scale.

Note: RH = Ranch Hand.

Comparison: Current Dioxin ≤ 10 ppt.

Background (Ranch Hand): Current Dioxin ≤ 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.

^b Difference of means after transformation to original scale; confidence interval on difference of means not presented because analysis was performed on natural logarithm scale.

^c P-value is based on difference of means on natural logarithm scale.

Table O-4-3.
Interaction Table for CD5 Cells (cells/mm³)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Age: Tables 19-7 and O-3-4)

Stratum	Dioxin Category	n	Adjusted Mean ^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.) ^b	p-Value
Born≥1942	Comparison	183	1,505.6		
	Background RH	47	1,440.8	-64.8	0.500
	Low RH	21	1,673.5	167.9	0.252
	High RH	65	1,565.3	59.7	0.497
	Low plus High RH	86	1,591.0	85.4	0.291
Born < 1942	Comparison	217	1,467.1		
	Background RH	93	1,594.7	127.6	0.091
	Low RH	74	1,391.8	-75.3	0.330
	High RH	41	1,545.3	78.2	0.446
	Low plus High RH	115	1,444.7	-22.4	0.741

^a Transformed from natural logarithm scale.

Note: RH = Ranch Hand.

Comparison: Current Dioxin ≤ 10 ppt.

Background (Ranch Hand): Current Dioxin ≤ 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.

^b Difference of means after transformation to original scale; confidence interval on difference of means not presented because analysis was performed on natural logarithm scale.

^c P-value is based on difference of means on natural logarithm scale.

Table O-4-4.
Interaction Table for CD14 Cells (cells/mm³)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Age: Tables 19-9 and O-3-6)

Stratum	Dioxin Category	n	Adjusted Mean ²	Difference of Adjusted Mean vs. Comparisons (95% C.I.) ^b	p-Value ^c
Born ≥ 1942	Comparison	183	482.5		
	Background RH	47	468.8	-13.7	0.573
	Low RH	21	511.5	29.0	0.416
	High RH	65	495.3	12.8	0.559
	Low plus High RH	86	499.2	16.7	0.404
Born < 1942	Comparison	220	508.5		
	Background RH	94	528.8	20.3	0.304
	Low RH	74	454.4	-54.1	0.008
	High RH	43	465.8	-42.7	0.091
	Low plus High RH	117	458.5	-50.0	0.004

^a Transformed from natural logarithm scale.

Note: RH = Ranch Hand.

Comparison: Current Dioxin ≤ 10 ppt.

Background (Ranch Hand): Current Dioxin ≤ 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.

^b Difference of means after transformation to original scale; confidence interval on difference of means not presented because analysis was performed on natural logarithm scale.

^c P-value is based on difference of means on natural logarithm scale.

Table O-4-5.
Interaction Table for CD16+56 Cells (cells/mm³)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Lifetime Alcohol History: Tables 19-10 and O-3-7))

	(Dioxin Category-by-Lifetime Alcohol History: Tables 19-10 and O-3-7))												
Stratum	Dioxin Category	n	Adjusted Mean ^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.) ^b	p-Value ^c								
0	Comparison	20	242.8										
Drink-years													
	Background RH	10	334.3	91.5	0.142								
	Low RH	4	216.8	-26.0	0.704								
	High RH	9	395.1	152.3	0.028								
	Low plus High RH	13	328.4	85.6	0.123								
>0-40 Drink-years	Comparison	276	249.0										
ŭ	Background RH	98	239.9	-9.1	0.572								
	Low RH	63	210.7	-38.3	0.038								
	High RH	72	224.7	-24.3	0.173								
	Low plus High RH	135	218.0	-31.0	0.028								
>40 Drink-years	Comparison	103	246.5										
y	Background RH	31	210.2	-36.3	0.170								
	Low RH	27	240.5	-6.0	0.837								
	High RH	25	234.4	-12.1	0.682								
	Low plus High RH	52	237.6	-8.9	0.692								

^a Transformed from natural logarithm scale.

Note: RH = Ranch Hand.

Comparison: Current Dioxin ≤ 10 ppt.

Background (Ranch Hand): Current Dioxin ≤ 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.

^b Difference of means after transformation to original scale; confidence interval on difference of means not presented because analysis was performed on natural logarithm scale.

^c P-value is based on difference of means on natural logarithm scale.

Table O-4-6.
Interaction Table for CD25 Cells (cells/mm³)
Occupation Removed from Final Model

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Stratum	Dioxin Category	n	Adjusted Mean ^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.) ^b	p-Value ^c
Born ≥ 1942	Comparison	183	275.3		
	Background RH	47	255.8	-19.5	0.343
	Low RH	21	333.1	57.8	0.082
	High RH	65	273.5	-1.8	0.927
	Low plus High RH	86	287.0	11.7	0.500
Born < 1942	Comparison	216	269.3		
	Background RH	92	289.6	20.3	0.216
	Low RH	73	249.5	-19.8	0.238
	High RH	41	283.3	14.0	0.531
	Low plus High RH	114	261.2	-8.1	0.593

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Stratum	Dioxin Category	n	Adjusted Mean ^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.) ^b	p-Value ^c
0	Comparison	107	242.1		
Pack-years	-				
-	Background RH	44	234.9	-7.2	0.720
	Low RH	21	240.0	-2.1	0.938
	High RH	27	258.8	16.7	0.516
	Low plus High RH	48	251.8	9.7	0.677
>0-10	Comparison	113	272.4		
Pack-years	-				
·	Background RH	38	257.2	-15.2	0.516
	Low RH	25	291.3	18.9	0.529
	High RH	43	258.0	-14.4	0.523
	Low plus High RH	68	269.8	-2.6	0.896
>10	Comparison	179	280.9		
Pack-years	-				
-	Background RH	57	324.2	43.3	0.046
	Low RH	. 48	272.5	-8.4	0.690
	High RH	36	290.3	9.4	0.698
	Low plus High RH	84	280.0	-0.9	0.958

Table O-4-6. (Continued) Interaction Table for CD25 Cells (cells/mm³) Occupation Removed from Final Model

c) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Lifetime Alcohol History: Tables 19-12 and O-3-9)

	(Dioxin Category-by-	Lueume	AICUNOI FUSIOF	y: Tables 19-12 and 0-3-9)	
Stratum	Dioxin Category	n	Adjusted Mean ^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.) ^b	p-Value ^c
0	Comparison	20	231.5		
Drink-years					
	Background RH	10	286.1	54.6	0.245
	Low RH	4	336.3	104.8	0.136
	High RH	9	440.0	208.5	0.001
	Low plus High RH	13	405.0	173.5	0.001
>0-40 Drink-years	Comparison	276	272.4		
Dillik-years	Background RH	98	281.2	8.8	0.565
	Low RH	63	260.5	-11.9	0.507
	High RH	72	243.7	-28.7	0.078
	Low plus High RH	135	251.4	-21.0	0.113
>40 Drink-years	Comparison	103	267.2		
Dillik-years	Background RH	31	258.8	-8.4	0.743
	Low RH	27	269.2	2.0	0.941
	High RH	25	301.5	34.3	0.240
	Low plus High RH	52	284.3	17.1	0.429

^a Transformed from natural logarithm scale.

Note: RH = Ranch Hand.

Comparison: Current Dioxin ≤ 10 ppt.

Background (Ranch Hand): Current Dioxin ≤ 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.

^b Difference of means after transformation to original scale; confidence interval on difference of means not presented because analysis was performed on natural logarithm scale.

^c P-value is based on difference of means on natural logarithm scale.

Table O-4-7. Interaction Table for Double Labelled Cells: CD3 with CD25 (cells/mm³) Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Lifetime Cigarette Smoking History: Tables 19-14 and O-3-11)

Stratum	Dioxin Category	n	Adjusted Mean ²	Difference of Adjusted Mean vs. Comparisons (95% C.I.) ^b	p-Value ^c
0	Comparison	107	190.3		
Pack-years	_				
•	Background RH	44	185.4	-4.9	0.768
	Low RH	21	183.9	-6.4	0.772
	High RH	27	201.8	11.5	0.592
	Low plus High RH	48	193.7	3.4	0.836
>0-10	Comparison	113	218.3		
Pack-years					
	Background RH	38	206.5	-11.8	0.553
	Low RH	25	234.7	16.4	0.521
	High RH	43	211.9	-6.4	0.740
	Low plus High RH	68	220.0	1.7	0.919
>10	Comparison	179	226.6		
Pack-years	-				
-	Background RH	57	259.5	32.9	0.073
	Low RH	48	219.2	-7.4	0.685
	High RH	36	239.3	12.7	0.544
	Low plus High RH	84	227.6	1.0	0.943

Table O-4-7. (Continued) Interaction Table for Double Labelled Cells: CD3 with CD25 (cells/mm³) Occupation Removed from Final Model

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Lifetime Alcohol History: Tables 19-14 and O-3-11)

	(Dioxid Category-Dy-Litetime Alcohol Instory.			1 ables 15-14 and 0-5-11)	
Stratum	Dioxin Category	п	Adjusted Mean ^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.) ^b	p-Value ^c
0	Comparison	20	177.6		
Drink-years	-				
,	Background RH	10	247.3	69.7	0.087
	Low RH	4	283.6	106.0	0.079
	High RH	9	340.6	163.0	0.001
	Low plus High RH	13	321.9	144.3	0.001
>0-40 Drink-years	Comparison	276	219.5		
	Background RH	98	223.5	4.0	0.760
	Low RH	63	204.7	-14.8	0.325
	High RH	72	197.3	-22.2	0.110
	Low plus High RH	135	200.7	-18.8	0.096
>40 Drink-years	Comparison	103	212.9		
	Background RH	31	205.5	-7.4	0.733
	Low RH	27	217.3	4.4	0.848
	High RH	25	253.2	40.3	0.112
	Low plus High RH	52	233.9	21.0	0.259

^a Transformed from natural logarithm scale.

Note: RH = Ranch Hand.

Comparison: Current Dioxin \leq 10 ppt.

Background (Ranch Hand): Current Dioxin ≤ 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.

^b Difference of means after transformation to original scale; confidence interval on difference of means not presented because analysis was performed on natural logarithm scale.

^c P-value is based on difference of means on natural logarithm scale.

Table O-4-8.

Interaction Table for Double Labelled Cells: CD4 with CD8 (cells/mm³)

Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Age: Tables 19-16 and O-3-12)

Stratum	Dioxin Category	n	Adjusted Mean ^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.) ^b	p-Value ^c
Born≥1942	Comparison	159	30.7		
	Background RH	38	30.5	-0.2	0.964
	Low RH	20	40.2	9.5	0.088
	High RH	55	29.4	-1.3	0.679
	Low plus High RH	75	31.9	1.3	0.662
Born < 1942	Comparison	201	33.5		
	Background RH	88	37.5	4.0	0.189
	Low RH	65	27.1	- 6.4	0.027
	High RH	40	30.9	-2.6	0.489
	Low plus High RH	105	28.5	-5.0	0.044

^a Transformed from natural logarithm scale.

Note: RH = Ranch Hand.

Comparison: Current Dioxin ≤ 10 ppt.

Background (Ranch Hand): Current Dioxin ≤ 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.

^b Difference of means after transformation to original scale; confidence interval on difference of means not presented because analysis was performed on natural logarithm scale.

^c P-value is based on difference of means on natural logarithm scale.

Table O-4-9.
Interaction Table for IgA (mg/dl)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Race: Tables 19-19 and O-3-14)

Stratum	Dioxin Category	n	Adjusted Mean ^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.) ^b	p-Value ^c
Black	Comparison	55	230.4		
	Background RH	14	207.5	-22.9	0.439
	Low RH	23	298.2	67.8	0.022
	High RH	13	242.5	12.1	0.714
	Low plus High RH	36	276.7	47.3	0.059
Non-Black	Comparison	996	219.9		
	Background RH	353	215.7	-4.2	0.496
	Low RH	233	207.8	-12.1	0.086
	High RH	242	221.7	1.8	0.802
	Low plus High RH	475	214.8	-5.1	0.350

^a Transformed from natural logarithm scale.

Note: RH = Ranch Hand.

Comparison: Current Dioxin ≤ 10 ppt.

Background (Ranch Hand): Current Dioxin ≤ 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.

^b Difference of means after transformation to original scale; confidence interval on difference of means not presented because analysis was performed on natural logarithm scale.

^c P-value is based on difference of means on natural logarithm scale.

Table O-4-10.
Interaction Table for Lupus Panel: Rheumatoid Factor
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Physical Activity Index: Tables 19-27 and O-3-17) **Adjusted Relative Risk** Percent (95% C.I.)^a p-Value Present Stratum **Dioxin Category** n 574 17.8 Sedentary Comparison 0.457 0.84 (0.54, 1.32) Background RH 193 15.5 0.246 Low RH 139 13.7 0.73 (0.43,1.24) 0.63 (0.37,1.07) 0.085 164 11.6 High RH 0.059 0.68 (0.45, 1.02) 303 12.5 Low plus High RH Moderate Comparison 195 13.3 0.010 70 27.1 2.42 (1.23, 4.73) Background RH 0.099 1.91 (0.89,4.14) 51 23.5 Low RH 0.363 0.56 (0.16, 1.95) 39 7.7 High RH 0.479 1.28 (0.64, 2.57) 90 16.7 Low plus High RH 17.3 266 Very Active Comparison 0.072 0.51 (0.25, 1.06) 102 9.8 Background RH 0.249 1.48 (0.76,2.86) 63 23.8 Low RH 0.58 (0.22, 1.56) 0.282 48 10.4 High RH 0.820 18.0 1.07 (0.60,1.92) 111 Low plus High RH

Note: RH = Ranch Hand.

Comparison: Current Dioxin ≤ 10 ppt.

Background (Ranch Hand): Current Dioxin ≤ 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.

^a Relative risk and confidence interval relative to Comparisons.